LISTING OF THE CLAIMS

Please cancel claim 1.

1. (Canceled)

Please amend claims 2, 3, and 4 as follows:

2. (Currently Amended) The method for determining a mass flux of a particle as set forth in claim 19[1], wherein the recording step includes:

recording an image of a transparent particle.

3. (Currently Amended) The method for determining a mass flux of a particle as set forth in claim 19[1], further including:

identifying glare spots on the particle, the particle size being determined as a function of a separation between the glare spots.

4. (Currently Amended) The method for determining a mass flux of a particle as set forth in claim 19[1], wherein the step of determining the velocity includes:

determining the velocity as a function of a velocimetry of the particles within the images.

5. (Original) The method for determining a mass flux of a particle as set forth in claim 4, wherein the step of determining the velocity as a function of the velocimetry includes:

obtaining two exposures of the respective glare spots of the particles entrained in the fluid; and

measuring a displacement between the two exposures during a specified time interval.

6. (Original) The method for determining a mass flux of a particle as set forth in claim 4, wherein the step of determining the velocity as a function of the velocimetry includes:

detecting a Doppler shift of light.

Please amend claim 7 as follows:

7. (Currently Amended) An optical flow meter for determining a mass flux of a particle, comprising:

a camera for recording an image of the particle entrained in a two-phase flow; and

a processor for determining a size of the particle as a function of a separation between spots identified on the particle, determining a velocity of the particle, and determining the mass flux of the particle as a function of the size and velocity, wherein the spots are glare spots and the separation between the glare spots is determined as:

$$\underline{x_o = -aM\cos\frac{\theta_o}{2};}$$

$$\underline{x_1 = n\,a\,M\sin\frac{\theta_o}{2}\left[n^2 + 1 - 2n\cos\frac{\theta_o}{2}\right]^{\frac{1}{2}}\text{;and}}$$

$$\underline{d_p = \frac{2\Delta\varepsilon_p}{\left|-M\cos\frac{\theta_0}{2}\right| + \left|\frac{nM\sin\frac{\theta_0}{2}}{\sqrt{n^2+1-2n\cos\frac{\theta_0}{2}}}\right|}},$$

where d_p is an estimate of the particle diameter, n is a ratio of an index of refraction of a material of the particle to an index of refraction of a medium, a is a radius of the particle, M is an optical system magnification, Δ is a number of pixels separating the glare spots on a surface of a CCD, ε_p is a size of the pixels in the CCD, and θ_o is an observation angle.

Please cancel claims 8 and 9.

8. (Canceled)

9. (Canceled)

Please amend claim 10 as follows:

10. (Currently Amended) The optical flow meter for determining a mass flux of a particle as set forth in claim 7[8], wherein a Gaussian peak location estimate is used for determining a location of respective peaks of the glare spots, the separation between the glare spots being determined as a function of the locations of the peaks.

11. (Original) The optical flow meter for determining a mass flux of a particle as set forth in claim 7, wherein the camera is a CCD camera.

12. (Original) The optical flow meter for determining a mass flux of a particle as set forth in claim 7, wherein the particles are transparent.

Please amend claim 13 as follows:

13. (Currently Amended) A method for determining a size of a particle, the method comprising:

receiving an image of the particle entrained in a two-phase flow into a processor;

reducing background noise within the image;

grouping the pixels having non-zero values into respective particle image arrays;

identifying glare spots within the image as a function of the particle image arrays; and

determining the size of the particle as a function of a separation between the glare spots, wherein the separation between the glare spots is determined as:

$$x_o = -aM\cos\frac{\theta_o}{2};$$

$$x_1 = n\,a\,M\sin\frac{\theta_o}{2}\left[n^2+1-2n\cos\frac{\theta_o}{2}\right]^{\frac{1}{2}}\text{;and}$$

$$d_p = \frac{2\Delta\varepsilon_p}{\left|-M\cos\frac{\theta_0}{2}\right| + \left|\frac{nM\sin\frac{\theta_0}{2}}{\sqrt{n^2+1-2n\cos\frac{\theta_0}{2}}}\right|},$$

where d_p is an estimate of the particle diameter, n is a ratio of an index of refraction of a

<u>material of the particle to an index of refraction of a medium, a is a radius of the particle, M is an optical system magnification, Δ is a number of pixels separating the glare spots on a surface of a CCD, ε_p is a size of the pixels in the CCD, and θ_o is an observation angle</u>.

14. (Original) The method for determining a size and a velocity of a particle as set forth in claim 13, wherein the reducing step includes:

limiting non-zero intensity values of pixels within the image.

15. (Original) The method for determining a size and a velocity of a particle as set forth in claim 14, wherein the limiting step includes:

determining a global threshold intensity value for the pixels within the image; and

setting intensity values of pixels below the global threshold to zero.

16. (Original) The method for determining a size and a velocity of a particle as set forth in claim 15, further including:

determining a local threshold for discriminating the particle within the image.

17. (Original) The method for determining a size and a velocity of a particle as set forth in claim 13, wherein the grouping step includes:

scanning the image for the pixels having the non-zero values;

identifying one of the pixels as having the non-zero value;

identifying pixels adjacent to the pixel having the non-zero value;

grouping any of the adjacent pixels having the non-zero values into the particle image array;

identifying subsequent pixels adjacent to each of the adjacent pixels having the non-zero value; and

grouping any of the subsequent pixels into the particle image array.

18. (Original) The method for determining a size and a velocity of a particle as set forth in claim 13, further including:

rejecting ones of the particle image arrays that are saturated.

Please insert the following new claim into the application:

19. (New) A method for determining a mass flux of a particle, comprising:

recording an image of the particle entrained in a two-phase flow, using a camera; and

using a processor for determining a size of the particle as a function of a separation between spots identified on the particle, determining a velocity of the particle, and determining the mass flux of the particle as a function of the size and velocity, wherein the spots are glare spots and the separation between the glare spots is determined as:

$$x_o = -aM\cos\frac{\theta_o}{2};$$

$$x_1 = n\,a\,M\sin\frac{\theta_o}{2}\left[n^2+1-2n\cos\frac{\theta_o}{2}\right]^{\frac{1}{2}};\textbf{and}$$

$$d_p = \frac{2\Delta\varepsilon_p}{\left|-M\cos\frac{\theta_0}{2}\right| + \left|\frac{nM\sin\frac{\theta_0}{2}}{\sqrt{n^2+1-2n\cos\frac{\theta_0}{2}}}\right|},$$

where d_p is an estimate of the particle diameter, n is a ratio of an index of refraction of a material of the particle to an index of refraction of a medium, a is a radius of the particle, M is an optical system magnification, Δ is a number of pixels separating the glare spots on a surface of a CCD, ε_p is a size of the pixels in the CCD, and θ_o is an observation angle.